

We claim:

1. A method comprising: combining (A) a hydratable cementitious binder with (B) a crude glucose fermentation broth obtained from an industrial glucose fermentation process.

5 2. The method of claim 1 wherein said broth is obtained from an industrial glucose fermentation process without having been subjected to three different types of purification: broth filtration, decolorization, and clarification.

10 3. The method of claim 1 wherein said broth is obtained from an industrial glucose fermentation process without having been subjected to clarification whereby finely suspended particles have been removed from the broth suspension.

4. The method of claim 3 wherein said broth is obtained from said industrial glucose fermentation process without having been subjected to decolorizer, whereby said broth has an amber color.

15 5. The method of claim 4 wherein said broth is obtained from said industrial glucose fermentation process without having been subjected to a broth filter operative to remove mycelium cell material from said broth, whereby said broth comprises no less than 0.05% and no greater than 20% of mycelium cell material by weight of total solids in said broth.

20 6. The method of claim 1 wherein said broth, when subjected to high pressure liquid chromatography using a cationic resin packed column and an RI detector or UV detector at 210 nm UV light, demonstrates an elution profile (time vs. refractance) having at least two peaks, a first peak corresponding to gluconic acid or its salt form, and a second peak corresponding to oxalic acid or its salt form.

25 7. The method of claim 1 wherein said crude fermentation broth comprises: gluconic acid or its salt form, in the amount no less than 20% by wt no greater than 98% by wt, and at least one oligosaccharide selected from the group consisting of maltose, maltotriose, and high sugars, said oligosaccharide being present in an amount no less than 2% by wt and no greater than 80% by wt, all percentages herein being based upon total weight (wt) solids in said broth.

8. The method of claim 1 wherein said crude glucose fermentation broth is derived from a mixture of glucose and starch hydrolysate containing no less than 1% and no greater than 95% by total weight oligosaccharides, said oligosaccharides being selected from the group consisting of maltose, maltotriose, and higher sugars.

5 9. The method of claim 1 wherein said broth is derived from a mixture of glucose and starch hydrolysate, said starch hydrolysate being present in amount no less than 1% by weight and being selected from the group consisting of maltose, maltotriose, and higher sugars.

10 10. A composition made by the method of claim 1.

11. A composition made by the method of claim 9.

12. The composition of claim 11 further comprising a cement additive or concrete admixture.

13. A cementitious composition comprising a hydratable cementitious binder and the composition of claim 10.

15 14. A composition comprising: (A) a crude fermentation broth obtained from an industrial glucose fermentation process; and (B) a cement additive, concrete admixture, or mixture thereof.

20 15. The cementitious composition of claim 14 wherein said hydratable cementitious binder comprises Portland cement, masonry cement, mortar cement, limestone, hydrated lime, fly ash, granulated blast furnace slag, a pozzolan, silica fume, metakaolin, or mixture thereof.

16. The cementitious composition of claim 15 further comprising an aggregate comprising sand, gravel, crushed stone or mixture thereof.

25 17. The composition of claim 14 wherein said at least one other additive or admixture comprises at least one alkanolamine.

30 18. The composition of claim 14 wherein said component (B) is a conventional cement additive selected from the group consisting of molasses, a sulfonate, a melamine sulfonate formaldehyde condensate, a naphthalene sulfonate formaldehyde condensate, calcium chloride, sodium chloride, an amine, a protein, an alkanolamine, tall oil fatty acid, fatty acid or derivative thereof, fatty ester or derivative thereof, alkali and alkaline earth hydroxycarboxylic acid salts of gluconic

acid, glucoheptonic acid, citric acid, tartaric acid, mucic acid, malic acid, salicylic acid a dye, sucrose, glucose, alkali, alkaline earth, a choride, a bromide, corn syrup, sodium sarcosinate, calcium or sodium lignosulfonate, lignin, alcohols, phenol, acetic acid, anhydrous caustic soda, sodium hydroxide, potassium hydroxide, sodium linear alkylate sulfonate, formaldehyde, silica, a diglycinate, polymers containing oxyalkylene groups, calcium formate, formic acid, siloxane, a surfactant, a resin, a resin acid, a rosin, a rosin acids, polyacrylic acid, polyvinyl pyrrolidone, alkali, alkaline earth, an aluminate, a nitrite, a nitrate, a silicate, a carbonate, borate, phosphonate, lactate, sulfate, thiosulfate, benzoate, acetate, oxalate, ferricyanide, succinate, glycols, borate ester, phosphonate ester, phosphate ester, phenol and derivative thereof, a natural gum, a starch or derivative thereof, and hydrocolloids.

19. The composition of claim 14 wherein said component (B) is a conventional concrete or masonry admixture selected from the group consisting of an accelerator, retarder, air detrapper, air entrainer, alkali-reactivity reducer, bonding admixture, water-reducing admixture, superplasticizer, colorant, corrosion inhibitor, damp proofing admixture, gas forming agent, permeability reducer, pumping aid, fungicidal admixture, germicidal admixture, insecticidal admixture, waterproofing agents, finishing aids, anti-freeze agents, viscosity modifying agents, shrinkage reducing agents, shrinkage-compensating agents, strength enhancing agents, anti-efflorescence agents, expansive agents, and de-icing agent.

20. The composition of claim 14 wherein said component (B) comprises at least one oxyalkylene group.

21. A cementitious composition comprising a hydratable cementitious binder and the composition of claim 14.

22. A process for grinding cement, comprising: introducing to cement clinker, in a cement grinding mill operative to manufacture hydratable cement, a composition made according to claim 1.

23. Method for modifying a cementitious composition comprising combining a cement binder with the composition of claim 14.

30 24. A process for grinding cement, comprising: introducing to cement clinker, in a cement grinding mill operative to manufacture hydratable cement, a

crude glucose fermentation broth and at least one conventional cement additive or concrete or masonry admixture.